

U.S. Serial No. 10/707,032

9

BOE 0440 PA

AMENDMENTS TO THE DRAWINGS

To better facilitate clarity and understanding of Applicants' proposed invention, Applicants are herewith submitting a "cleaner" and more professional set of drawings to replace Applicants' originally submitted set of drawings. (See Replacement Sheets for Figures 1, 2, 3, 4A, 4B, 4C, 5, 6, 7, 8, and 9 included herewith.) In submitting this replacement set of drawings, Applicants respectfully maintain that no new matter has been introduced into Applicants' Application. Therefore, Examiner's entry and consideration of the replacement set of drawings is respectfully requested by Applicants.

In addition to submitting a replacement set of drawings, Applicants have also amended original Figure 2 of the Application. In Figure 2 as amended, original numerical designation "18," which referred to the "removable restraint and stowage system" discussed in paragraphs [0027] and [0028] of the specification, has been replaced with numerical designation "11." (Correspondingly, the "removable restraint and stowage system" has been redesignated as "11" in paragraphs [0027] and [0028] of the specification, as amended hereinabove, as well.) In redesignating the "removable restraint and stowage system" as "11" in this manner, Applicants merely seek to better distinguish the "removable restraint and stowage system" from the "distal ends" of the elongate ribs 14 depicted in Figure 3, wherein the "distal ends" are numerically designated as "18A," "18B," "18C," "18D," "18E," "18F," "18G," and "18H." In making such a numerical redesignation, Applicants respectfully maintain that no new matter has been introduced into Applicants' Application.

U.S. Serial No. 10/707,032

10

BOE 0440 PA

REMARKS

Examiner's comments in the Office Action dated March 21, 2005 have been carefully considered by Applicants. In view of such comments, Applicants have amended some of the claims as set forth herein. In particular, claims 1, 4-6, 8, 11, 12, 20, 24, 26, 28, 35, 40, and 41 have all been amended to better highlight the patentable differences of Applicants' proposed invention as compared to the prior art cited and interpreted by Examiner in the Office Action. In making such amendments, Applicants maintain that no new matter has been introduced into the present Application. In addition, claims 7, 9, 10, 14-19, 25, 27, 29-34, and 36-39 have all been canceled, and claims 2, 3, 13, and 21-23 remain pending in their original form. No entirely new claims have been added. Thus, claims 1-6, 8, 11-13, 20-24, 26, 28, 35, 40, and 41 remain pending in Applicants' present Application. It is Applicants' good faith belief that the pending claims, as presented herein, are both novel and non-obvious. Therefore, Applicants respectfully maintain that the pending claims now place the present Application in condition for allowance and notice thereof is respectfully requested.

CLAIM 1:

In the Office Action, Applicants' independent claim 1 stands rejected by Examiner under 35 U.S.C. § 102(b) as being anticipated by, and therefore unpatentable over, United States Patent Number 6,104,358, which was issued to Parker *et alia* on August 15, 2000 (hereinafter "Parker"). Applicants respectfully traverse this 35 U.S.C. § 102 rejection in view of claim 1 as herein amended, for Applicants deem the subject matter now specified in claim 1 to be novel in light of the prior art cited by Examiner.

In brief, Parker discloses and teaches a low-cost deployable reflector having an overall umbrella-like structure. The reflector disclosed and taught by Parker includes a plurality of tubular, parabolically curved ribs that are connected end-wise to a central hub by an associated number of strain energy hinges. The strain energy hinges are both flexible and spring-like in character and thus create a spring force when stressed. When restrained by a cable, the curved ribs can be held down so as to collapse the overall reflector for stowage. When the reflector is collapsed and stowed as such, the strain energy hinges are thereby stressed so as to exert a counter-biasing force. In this way, whenever the cable restraint is subsequently

U.S. Serial No. 10/707,032

11

BOE 0440 PA

removed from the ribs for reflector deployment, the counter-biasing force exerted by the strain energy hinges causes the hinges to automatically pivot the ribs outward, thereby enabling the reflector to assume its parabolic shape for operation. (Parker, see abstract; and column 3, lines 1-19). Furthermore, as also disclosed and taught by Parker, the hub and ribs of the reflector "are suitably formed from carbon graphite material." (Parker, see column 4, lines 61-62; column 10, lines 18-20; and column 14, lines 5-8).

For Parker to anticipate Applicants' independent claim 1 and render the subject matter of claim 1 unpatentable, Parker must disclose all of the following subject matter now specified and required by claim 1 as amended:

A framework for a deployable antenna, said framework comprising:
a hub;
a plurality of elongate ribs each having a proximal end and a distal end; and
a matching plurality of foldable resilient members interconnecting the proximal ends of said elongate ribs to said hub;
wherein at least one of said hub, said elongate ribs, and said foldable resilient members comprises non-metallic fibers embedded within a resin matrix; said non-metallic fibers comprise carbon in its allotropic form of graphite; and said resin matrix includes at least one type of resin selected from the group consisting of an epoxy resin, a cyanate ester resin, and a thermoplastic resin.

Parker, however, fails to anticipate such a framework for a deployable antenna, for Parker does not disclose a framework wherein (1) "at least one of said hub, said elongate ribs, and said foldable resilient members comprises non-metallic fibers embedded within a resin matrix" and (2) "said resin matrix includes at least one type of resin selected from the group consisting of an epoxy resin, a cyanate ester resin, and a thermoplastic resin" as now required by Applicants' claim 1. Instead, as alluded to earlier hereinabove, Parker merely discloses a deployable reflector having a hub and ribs that "are suitably formed from carbon graphite material." (Parker, see column 4, lines 61-62; column 10, lines 18-20; and column 14, lines 5-8).

In view of the above, Applicants respectfully maintain that Parker does not anticipate Applicants' independent claim 1 as herein amended. Therefore, Applicants respectfully request

U.S. Serial No. 10/707,032

12

BOE 0440 PA

that Examiner's rejection of claim 1 under 35 U.S.C. § 102(b) be withdrawn and that a Notice of Allowance for claim 1 be issued.

CLAIM 2:

In the Office Action, Applicants' dependent claim 2 stands rejected by Examiner under 35 U.S.C. § 103(a) as being rendered obvious by, and therefore unpatentable over, Parker in view of United States Patent Number 4,498,087, which was issued to Imbiel *et alia* on February 5, 1985 ("Imbiel"). Applicants respectfully traverse this 35 U.S.C. § 103 rejection in view of claim 2 being dependent on claim 1 as herein amended, for Applicants deem the overall subject matter now encompassed by claim 2 to be non-obvious in light of the prior art cited by Examiner.

With general regard to Examiner's rejection under 35 U.S.C. § 103, Applicants respectfully maintain that rejection for obviousness must be based upon objective evidence of record and requires that particular findings be made as to why a skilled artisan with no knowledge of the claimed invention would have selected the specific components for combination in the manner claimed. Thus, in order for any prior art references themselves to be validly combined for use in a prior art obviousness rejection under 35 U.S.C. § 103(a), the references themselves, or some other piece of prior art, must suggest that they be combined. In re Sernaker, 217 U.S.P.Q. 1, 6 (C.A.F.C. 1983). That is, the suggestion to combine the references must not come from Applicants' proposed invention itself. Orthopedic Equipment Co. v. United States, 217 U.S.P.Q. 193, 199 (C.A.F.C. 1983). In sum, in order to establish a *prima facie* case of obviousness, it is necessary to present evidence, in the form of some teaching, suggestion, incentive, or inference in the applied prior art, or in the form of generally available knowledge, that one having ordinary skill in the art would have been led to combine the relevant teachings of the applied references in the proposed manner to arrive at the claimed invention. Ex parte Levengood, 28 U.S.P.Q. (2d) 1300 (P.T.O.B.A.&I. 1993).

With specific regard to Examiner's obviousness rejection of Applicants' dependent claim 2, Applicants maintain that the combination of Parker and Imbiel does not render obvious the overall subject matter encompassed by claim 2. In particular, Applicants maintain that Parker and Imbiel, either individually or in combination, neither teach nor suggest all of the following subject matter now specified and required by claim 2 as dependent on claim 1:

U.S. Serial No. 10/707,032

13

BOE 0440 PA

A framework for a deployable mesh reflector type antenna, said framework comprising:

- a hub;
- a plurality of elongate ribs each having a proximal end and a distal end; and
- a matching plurality of foldable resilient members interconnecting the proximal ends of said elongate ribs to said hub;

wherein at least one of said hub, said elongate ribs, and said foldable resilient members comprises non-metallic fibers embedded within a resin matrix; said non-metallic fibers comprise carbon in its allotropic form of graphite; and said resin matrix includes at least one type of resin selected from the group consisting of an epoxy resin, a cyanate ester resin, and a thermoplastic resin.

Instead, as alluded to earlier hereinabove, Parker merely teaches a deployable reflector having a hub and ribs that "are suitably formed from carbon graphite material." (Parker, see column 4, lines 61-62; column 10, lines 18-20; and column 14, lines 5-8). Imbiel, moreover, merely teaches an apparatus for unfolding a reflector for an antenna, wherein the apparatus includes ribs that are "preferably made of fiber-reinforced synthetic material, such as carbon fibers embedded in a resin matrix." (Imbiel, see abstract; and column 3, lines 45-47). Thus, Parker and Imbiel, either individually or in combination, neither teach nor suggest a deployable antenna framework wherein (1) "at least one of said hub, said elongate ribs, and said foldable resilient members comprises non-metallic fibers embedded within a resin matrix" and (2) "said resin matrix includes at least one type of resin selected from the group consisting of an epoxy resin, a cyanate ester resin, and a thermoplastic resin" as now required by Applicants' claim 2 as dependent on claim 1.

In view of the above, Applicants respectfully maintain that Parker and Imbiel do not render Applicants' dependent claim 2 as being obvious. Therefore, Applicants respectfully request that Examiner's rejection of claim 2 under 35 U.S.C. § 103(a) be withdrawn and that a Notice of Allowance for claim 2 be issued.

CLAIM 3:

In the Office Action, Applicants' dependent claim 3 stands rejected by Examiner under 35 U.S.C. § 102(b) as being anticipated by Parker. Since claim 3 is dependent on independent claim 1, Applicants respectfully traverse this 35 U.S.C. § 102 rejection and maintain that the

U.S. Serial No. 10/707,032

14

BOE 0440 PA

subject matter specified in claim 3 is unanticipated by Parker for at least the same reason(s) discussed hereinabove with regard to claim 1. Therefore, Applicants respectfully request that Examiner's rejection of claim 3 under 35 U.S.C. § 102(b) be withdrawn and that a Notice of Allowance for claim 3 be issued.

CLAIM 4:

In the Office Action, Applicants' dependent claim 4 stands rejected by Examiner under 35 U.S.C. § 103(a) as being rendered obvious by, and therefore unpatentable over, Parker in view of Imbiel. Applicants respectfully traverse this 35 U.S.C. § 103 rejection in view of claim 4 being dependent on claim 1 as herein amended, and for reasons similar to those discussed hereinabove with regard to Applicants' dependent claim 2.

In view of the above, Applicants respectfully maintain that Parker and Imbiel do not render Applicants' dependent claim 4 as being obvious. Therefore, Applicants respectfully request that Examiner's rejection of claim 4 under 35 U.S.C. § 103(a) be withdrawn and that a Notice of Allowance for claim 4 be issued.

CLAIM 5:

In the Office Action, Examiner indicated that Applicants' original dependent claim 5 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claims 1 and 4 specifically set forth therein. In response, Applicants have herein amended claim 5 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 5 be issued.

CLAIM 6:

Since Applicants' claim 6 as amended herein is now dependent on independent claim 5, Applicants maintain that the subject matter specified in claim 6 is allowable for at least the same reason(s) that the subject matter in claim 5 is deemed allowable. Therefore, Applicants respectfully request that a Notice of Allowance for claim 6 be issued.

CLAIM 7:

Applicants have canceled claim 7.

U.S. Serial No. 10/707,032

15

BOE 0440 PA

CLAIM 8:

In the Office Action, Examiner Indicated that Applicants' original dependent claim 8 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claims 1 and 7 specifically set forth therein. In response, Applicants have herein amended claim 8 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 8 be issued.

CLAIMS 9 AND 10:

Applicants have canceled claims 9 and 10.

CLAIM 11:

In the Office Action, Examiner indicated that Applicants' original dependent claim 11 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claims 1 and 10 specifically set forth therein. In response, Applicants have herein amended claim 11 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 11 be issued.

CLAIMS 12 AND 13:

Since Applicants' claims 12 and 13 as amended herein are now dependent on independent claim 11, Applicants maintain that the respective subject matter specified in claims 12 and 13 is allowable for at least the same reason(s) that the subject matter in claim 11 is deemed allowable. Therefore, Applicants respectfully request that a Notice of Allowance for claims 12 and 13 be issued.

CLAIMS 14-19:

Applicants have canceled claims 14-19.

CLAIM 20:

In the Office Action, Examiner indicated that Applicants' original dependent claim 20 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claims 1, 14, 15, and 18 specifically set

U.S. Serial No. 10/707,032

16

BOE 0440 PA

forth therein. In response, Applicants have herein amended claim 20 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 20 be issued.

CLAIMS 21-24:

Since Applicants' claims 21-24 are dependent on Independent claim 20, Applicants maintain that the respective subject matter specified in claims 21-24 is allowable for at least the same reason(s) that the subject matter in claim 20 is deemed allowable. Therefore, Applicants respectfully request that a Notice of Allowance for claims 21-24 be issued.

CLAIM 25:

Applicants have canceled claim 25.

CLAIM 26:

In the Office Action, Examiner indicated that Applicants' original dependent claim 26 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claims 1 and 25 specifically set forth therein. In response, Applicants have herein amended claim 26 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 26 be issued.

CLAIM 27:

Applicants have canceled claim 27.

CLAIM 28:

In the Office Action, Examiner indicated that Applicants' original dependent claim 28 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claim 27 specifically set forth therein. In response, Applicants have herein amended claim 28 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 28 be issued.

CLAIMS 29-34:

Applicants have canceled claims 29-34.

U.S. Serial No. 10/707,032

17

BOE 0440 PA

CLAIM 35:

In the Office Action, Examiner indicated that Applicants' original dependent claim 35 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claims 31 and 34 specifically set forth therein. In response, Applicants have herein amended claim 35 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 35 be issued.

CLAIMS 36-39:

Applicants have canceled claims 36-39.

CLAIM 40:

In the Office Action, Examiner indicated that Applicants' original dependent claim 40 contained allowable subject matter and would be in condition for allowance if rewritten in independent form with the subject matter of original claims 36 and 39 specifically set forth therein. In response, Applicants have herein amended claim 40 per Examiner's instructions and now respectfully request that a Notice of Allowance for claim 40 be issued.

CLAIM 41:

In the Office Action, Applicants' independent claim 41 stands rejected by Examiner under 35 U.S.C. § 103(a) as being rendered obvious by, and therefore unpatentable over, Parker in view of Imbiel. Applicants respectfully traverse this 35 U.S.C. § 103 rejection in view of claim 41 as herein amended, for Applicants deem the subject matter now specified in claim 41 to be non-obvious in light of the prior art cited by Examiner.

With regard to Examiner's obviousness rejection of Applicants' independent claim 41, Applicants maintain that the combination of Parker and Imbiel does not render obvious the subject matter encompassed by claim 41. In particular, Applicants maintain that Parker and Imbiel, either individually or in combination, neither teach nor suggest all of the following subject matter now specified and required by claim 41:

A method for stowing and deploying a rib-supported mesh reflector antenna, said method comprising the steps of:
obtaining a hub, a plurality of elongate ribs each having a proximal end and a distal end, and a matching plurality of foldable

U.S. Serial No. 10/707,032

18

BOE 0440 PA

resilient members; wherein at least one of said hub, said elongate ribs, and said foldable resilient members comprises non-metallic fibers embedded within a resin matrix; said non-metallic fibers comprise carbon in its allotropic form of graphite; and said resin matrix includes at least one type of resin selected from the group consisting of an epoxy resin, a cyanate ester resin, and a thermoplastic resin;

interconnecting the proximal ends of said plurality of elongate ribs to said hub with said matching plurality of foldable resilient members;

suspending a commonly held reflective mesh from the distal ends of said elongate ribs;

applying a removable restraint to said elongate ribs to thereby hold and stow said elongate ribs in a captured position wherein said foldable resilient members are forcibly folded such that said distal ends of said elongate ribs are proximately situated together; and

removing said restraint from said elongate ribs so that strain energy, stored within said foldable resilient members when forcibly folded, forcibly unfolds said foldable resilient members in an elastic manner such that said elongate ribs are thereby splayed apart in a released position and said reflective mesh is automatically deployed.

Instead, as alluded to earlier hereinabove, Parker merely teaches a deployable reflector having a hub and ribs that "are suitably formed from carbon graphite material." (Parker, see column 4, lines 61-62; column 10, lines 18-20; and column 14, lines 5-8). Imbiel, moreover, merely teaches an apparatus for unfolding a reflector for an antenna, wherein the apparatus includes ribs that are "preferably made of fiber-reinforced synthetic material, such as carbon fibers embedded in a resin matrix." (Imbiel, see abstract; and column 3, lines 45-47). Thus, Parker and Imbiel, either individually or in combination, neither teach nor suggest a method for stowing and deploying a rib-supported mesh reflector antenna wherein (1) "at least one of said hub, said elongate ribs, and said foldable resilient members comprises non-metallic fibers embedded within a resin matrix" and (2) "said resin matrix includes at least one type of resin selected from the group consisting of an epoxy resin, a cyanate ester resin, and a thermoplastic resin" as now required by Applicants' claim 41.

In view of the above, Applicants respectfully maintain that Parker and Imbiel do not render Applicants' independent claim 41 as being obvious. Therefore, Applicants respectfully

U.S. Serial No. 10/707,032

19

BOE 0440 PA

request that Examiner's rejection of claim 41 under 35 U.S.C. § 103(a) be withdrawn and that a Notice of Allowance for claim 41 be issued.

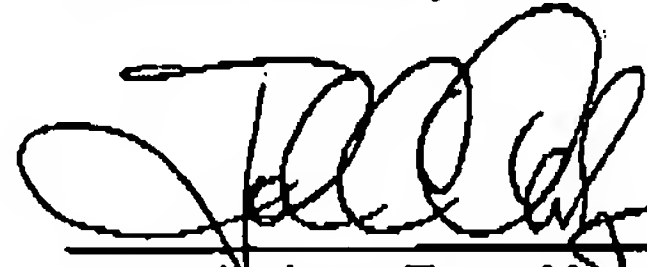
CONCLUSION

In view of the foregoing remarks, Applicants respectfully submit that claims 1-6, 8, 11-13, 20-24, 26, 28, 35, 40, and 41 are both novel and non-obvious with respect to the disclosures and teachings of Parker and Imbiel. Therefore, Applicants respectfully request that Examiner's rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) be withdrawn and that a Notice of Allowance be issued for all pending claims.

Should the Examiner have any questions with respect to any matter now of record, Examiner is invited to contact Applicants' undersigned attorney at (248) 223-9500.

Respectfully submitted,

ARTZ & ARTZ, P.C.



John A. Artz, Reg. No. 25,824
28333 Telegraph Road, Suite 250
Southfield, MI 48034
(248) 223-9500

Dated: June 20, 2005